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Neighborhood Disorder and Juvenile Drug Arrests: A Preliminary Investigation using the NIfETy Instrument

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Abstract

Background—Disordered neighborhood environments are associated with crime, drug use, and poor health outcomes. However, research utilizing objective instruments to characterize the neighborhood environment is lacking. Objectives: This investigation examines the relationship between objective measures of neighborhood disorder and juvenile drug arrests (JDAs) in an urban locale.

Methods—The neighborhood disorder scale was developed using indicators from the Neighborhood Inventory for Environmental Typology (NIfETy) instrument; a valid and reliable tool that assesses physical and social disorder. Data on 3146 JDAs from 2006 were obtained from the police department.

Results—Negative binomial regression models revealed a significant association between neighborhood disorder and the count of JDAs in the neighborhood ($\beta == .34$, $p < .001$). The relationship between neighborhood disorder and JDAs remained significant after adjusting for percent African-Americans in the neighborhood ($\beta == .24$, $p < .001$).

Conclusions—This preliminary investigation identified a positive and statistically significant relationship between an objective measure of neighborhood disorder and JDAs. Future investigations should examine strategies to reduce drug-related crime by addressing the larger neighborhood and social context in which drug involvement and crime occurs.

Keywords

Neighborhood; drug arrests; adolescents; crime

INTRODUCTION

Studies examining the relationship between neighborhood disorder and neighborhood drug arrests are underrepresented and denote a significant gap in existing knowledge. Neighborhood disorder refers to a lack of order and social control within the neighborhood

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and is often measured by visible cues within the neighborhood environment (e.g., graffiti, broken windows, abandoned housing) (1). Some early research suggested that the relationship between neighborhood disorder and crime may be spurious – explained better by levels of collective efficacy – but more recent literature suggests that although collective efficacy may mediate the relationship between the two factors, there is no evidence that the relationship is spurious (1,2). Two more recent studies have examined the relationship between neighborhood disorder and juvenile offending (3,4). Fite et al. (3) examined the risk factors that might explain the increased rates of juvenile arrests among African-American males compared with Caucasian males. The authors found that neighborhood disorder (self-reported caretaker reports of vandalism, assault, etc.) was the most important factor accounting for the discrepancy in violence-related arrest rates between African-American and Caucasian males. However, there was no relationship between neighborhood disorder or any other risk factors (externalizing behaviors, parent–child relationship, etc.) and drug arrests. In an earlier study, researchers found that neighborhood disorder moderated the relationship between impulsivity and juvenile offending; the relationship between impulsivity and juvenile offending was stronger in low-income neighborhoods (4).

Although these earlier studies were informative, they relied on self-report and census measures to characterize the neighborhood environment. Census data and self-report data have been useful and widely used in neighborhood research, but there are inherent limitations to both sources of data (5,6). Census data are only collected once a decade, and geographic units based on census data (e.g., census-tract, census block group) may not match residents' perceptions or experiences of neighborhood boundaries. Self-reported perceptions of neighborhood environment may result in flawed inferences due to reporting bias (7).

This study addresses this limitation in previous research by using an objective measure of neighborhood disorder based on indicators from a valid and reliable neighborhood instrument (8,9) that was administered in the same year as the arrest data. In our previous work, we found that objective measures of neighborhood disorder are associated with precursors to juvenile drug arrests (JDAs), including marijuana use, risk-taking propensity, and internalizing problems (10-12). Furr-Holden et al. (10) found that the growth of neighborhood disorder, as measured by the presence of abandoned buildings, predicted subsequent drug use in a sample of predominately African-American young adults. Another study found that neighborhood disorder was associated with laboratory measures of risk-taking propensity during late childhood (11). However, it is unclear whether neighborhood disorder is only associated with drug use and general risk-taking or weather it is also associated with drug arrests. This is a critical gap in the literature because drug use is not necessarily associated with arrests for drugs. For example, African-American youths are far more likely to be arrested for marijuana offenses than Caucasian youths, despite similar rates of marijuana use among African-American youths compared with Caucasians (13,14). This investigation will examine the relationship between objectively measured neighborhood disorder and neighborhood counts of JDAs in a predominately African-American city.

METHODS

Data Sources

Juvenile Drug Arrests—Data on 3146 JDAs (younger than 18 years of age) come from the Baltimore City Police Department. The data included the count of drug arrests by charge type in each Baltimore City neighborhood for the 2006 calendar year.

Neighborhood Data: The NIfETy Instrument—The Neighborhood Inventory for Environmental Typology (NIfETy) is a standardized tool that is used to assess characteristics of the neighborhood environment related to violence, alcohol, and other drug (VAOD) exposure (8). The NIfETy instrument consists of seven domains: 1) physical layout of the block, 2) types of structures, 3) adult activity, 4) youth activity, 5) physical disorder and order, 6) social disorder and order, and 7) violence and AOD indicators. NIfETy assessments are conducted independently by a pair of trained field raters who enter the environmental assessments into personal digital assistants (PDAs). Once entered, observed data are then uploaded to a secure server.

Observations using the NIfETy are both valid and reliable (9) for total scale [Internal Consistency Reliability (ICC) is 0.84], VAOD subscale (ICC=0.71), and across raters (ICC=0.67-0.79). The procedure also demonstrated high validity when comparing NIfETy indicators of VAOD exposure with self-reported VAOD exposure in a sample of young adults and also with local crime data (9).

During the same year the JDAs occurred, a total of 919 block faces in Baltimore City were assessed using the NIfETy Instrument and will be included in this investigation. Data consisted of NIfETy assessments conducted with a stratified random sample of 447 block faces (1 block face per 10 census blocks in a defined neighborhood statistical area within Baltimore City) and 472 residential block faces of a sample of young adults, dispersed across the City and selected at random (8,10). On average, there were 3.79 block faces assessed for each neighborhood (SD=3.90, Range: 1-38).

Measures

Count of Juvenile Drug Arrests—The outcome of interest for this investigation is the count of JDAs in each Baltimore City residential neighborhood. The data received from the Baltimore City Police Department was aggregated by neighborhood. Fifty-two drug arrests were not assigned a neighborhood or were in a non-residential neighborhood.

Neighborhood Disorder—The *neighborhood disorder scale* was developed using exploratory factor analysis (EFA) of 21 NIfETy indicators related to neighborhood disorder in earlier research (10,15,16). Eleven items consistently loaded together (loadings: .51–.90) and had a prevalence greater than 5%: structures with broken windows, unboarded abandoned buildings, unmaintained property, trash in open spaces, broken bottles, graffiti, noise, people yelling, public alcohol consumption, drug paraphernalia (e.g., drug baggies, syringes), and discarded alcohol bottles ($\alpha = .78$). The disorder scale was created by multiplying the factor loadings from the EFA by 1 if the indicator was present and summing the scale for each of the 919 block faces. The disorder scale ranged from 0 to 8.17 for each

block face, the mean was 2.35 (SD = 2.04). This disorder scale has been associated with anxiety and risk-taking propensity among early adolescents in previous investigations (11,17).

An aggregate neighborhood disorder scale (herein referred to as *neighborhood disorder*) was produced for each of the 242 residential neighborhoods in Baltimore City by taking the mean disorder scale of the sampled block faces within the neighborhood (see Figure 1). This approach was used in a previous investigation examining the association between neighborhood indicators of violence and academic achievement (18).

Statistical Analysis

The outcome of interest, the count of juvenile drug arrests was consistent with a negative binomial distribution. Accordingly, negative binomial regression models were used to estimate the association between neighborhood disorder and the count of JDAs per neighborhood (i.e. each neighborhood is treated as a case). The population of the neighborhood was used as an offset variable. We also stratified the JDA count by charge: possession, possession with intent to distribute, and distribution to determine if the association with neighborhood disorder was modified by charge type. Incident rate ratios (IRR) were calculated to convey the strength of association and significant findings were reported for alpha levels below 0.05. Stata 11.0 was used for statistical analyses (19).

RESULTS

The descriptive statistics are included in Table 1. The mean population for the neighborhoods included in this investigation was 2,662 and ranged from 168 to 16,792. The neighborhoods were predominately African American (64.9%), which is consistent with the racial composition of the entire city (63.7%African American). The majority of the drug arrests were possession charges (38.4%). Possession with intent accounted for 35.2% of the drug arrests and distribution accounted for 23.4% of the drug arrests. The aggregated neighborhood disorder scale ranged from 0 to 7.8.

There was a positive relationship between neighborhood disorder and the count of JDAs (Table 2; $\beta = 0.34$, $p<0.001$); for each unit increase in neighborhood disorder, juvenile drug arrests increased by a factor of 40% ($e^{\beta}=1.40$). When the outcome was stratified by charge, the estimates for distribution and possession with intent to distribute were the same ($\beta = 0.40$, $p<0.001$; $e^{\beta}=1.50$). For each unit increase in neighborhood disorder, juvenile drug arrests for possession increased by a factor of 29% ($\beta = 0.26$, $p<0.001$; $e^{\beta}=1.29$). Other aggregate measures of neighborhood disorder (i.e. median and maximum) were used as predictors and the results were positive and statistically significant. The sample of 919 blocks used for the neighborhood disorder measure included randomly selected block faces (n = 447) and block faces of the residents of a sample of young adults (n = 472). There was stronger likelihood of a juvenile drug arrest on a block where we know a young adult lives. To determine whether this influenced our results, we examined the relationship between neighborhood disorder and JDAs using only the randomly selected blocks and the results were similar ($\beta = 0.32$, $p<0.001$ for randomly selected blocks; $\beta = 0.34$, $p<0.001$ for all blocks).

Indicators of socio-economic status were unavailable at the neighborhood-level used in this study, but we were able to control for the percentage of African American residents. The percentage of African American residents by neighborhood was strongly associated with count of JDAs ($\beta = 2.10$, $p<0.001$), which is consistent with earlier investigations (3). When the JDAs were stratified by charge type, the relationship between the percentage of African Americans and distribution charges had the strongest association ($\beta = 2.72$, $p<0.001$) compared to possession and possession with intent to distribute. Adjusting for the percentage of African Americans attenuated the relationship between neighborhood disorder and JDAs (Table 3). While holding the percentage of African American residents constant, juvenile drug arrests increased by a factor 27% for each unit increase in neighborhood disorder ($\beta = 0.24$, $p<0.001$; $e^{\beta}=1.27$). The percentage of African American residents in the neighborhood also reduced the strength of the association between neighborhood disorder and JDAs when stratified by charge type although the regression model remains statistically significant.

DISCUSSION

Ecological and epidemiological models highlight the significance of neighborhood context to health and well-being (20); further, geographic methods support the creation of neighborhoodbased measures to capture the spatial and structural nature of risk environments. In this preliminary investigation, there was a positive and significant relationship between the count of JDAs and neighborhood disorder. These findings are consistent with earlier studies that found that concentrated poverty and observable physical decay at the community level might explain variation in levels of arrests and specific involvement in drug/alcohol-related activities (10,21,22). The strength of this study is its use of geographic methods and a reliable, valid and objective environmental assessment tool of disorder to examine associations of disorder and drug-related arrests in an urban setting. This represents a noteworthy advancement over previous research that relied on economic and structural factors from census data, rarely providing opportunities for targeted interventions or neighborhood improvement. Although prior research has shown associations between disorder and crime, using a validated measure of neighborhood disorder provides initial steps in understanding the aspects of disorder amenable to interventions. This preliminary investigation supports a growing body of research exploring the association between neighborhood-level disorder and drug-related arrests and helps to better align the conceptualizations of neighborhood-level disorder and drug activity, thereby enhancing intervention planning.

This work should be interpreted in view of several limitations. First, we examine data only at one point in time, so causality could not be determined. For example, longitudinal studies are needed in determining whether neighborhood disorder leads to drug arrests or whether both drug arrests and neighborhood disorder are better explained by a third variable, such as drug activity, in the neighborhood. Second, juveniles who recidivate will inflate the JDA count for their neighborhood. Third, there was no measure of socioeconomic status of the residents or of the JDA youth. However, we were able to control for percent African-American living in the neighborhood, a sociodemographic variable previously found to be related to drug arrests (3,13). Despite these limitations, this study provides preliminary

evidence of the co-occurrence of community disorder and youth drug arrests. Additionally, we found that increases in the percentage of African-Americans in the neighborhood were associated with increased community disorder and youth drug arrests. We are cautious in noting the racial findings observed in this investigation as racial segregation is often confounded by poverty. Future investigations should examine the interplay between racial segregation, concentrated poverty, and neighborhood disorder, as racial segregation of African-Americans is often associated with concentrated poverty, which is a leading indicator of crime and enforcement activities of police and may account for the increased rates of JDAs. Approaches to reduce drug-related crime by addressing the larger neighborhood and social context in which drug involvement and crime occurs warrant further consideration.

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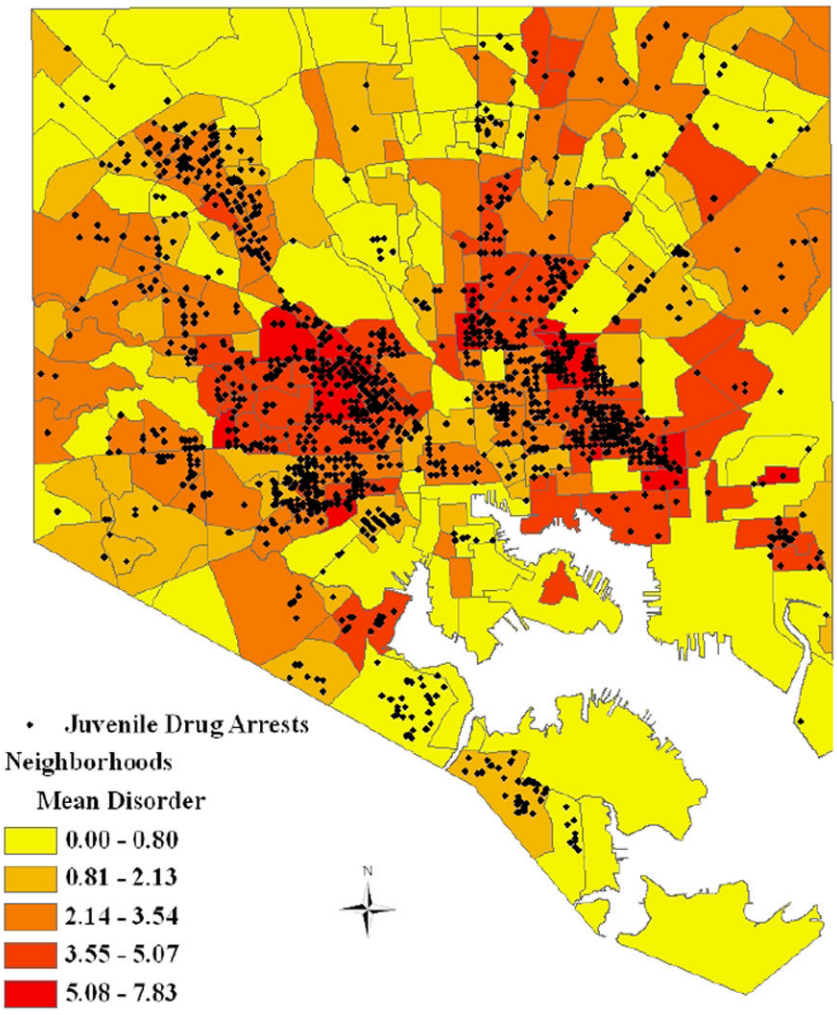

Figure 1.
Neighborhood Disorder and JDA Locations

Table 1

Descriptive Statistics by Neighborhood

Characteristics*	Count	Mean	Standard Deviation	Median
Neighborhood Disorder Scale	--	2.50	1.75	2.46
Juvenile Drug Arrests (n = 3095)	3095	12.73	23.65	4.00
Distribution (n = 819)	819	3.37	7.91	0.00
Possession with intent to distribute (n = 1088)	1088	4.48	9.36	1.00
Possession (n = 1188)	1188	4.89	7.74	2.00
Total Population *(in thousands)*	644	2662	2382	2079
African American residents *(in thousands)*	418	1720	1973	1299

* For the 242 residential neighborhoods

Table 2

Unadjusted Negative Binomial Regression Models (n = 242)

	Juvenile Drug Arrests		Distribution		Possession w/intent		Possession	
	IRR	***p***	**IRR**	***p***	**IRR**	***p***	**IRR**	***p***
Neighborhood Disorder	1.40	<0.01	1.50	<0.01	1.50	<0.01	1.29	<0.01

Table 3

Adjusted Negative Binomial Regression Models* (n = 242)

	Juvenile Drug Arrests		Distribution		Possession w/ intent		Possession	
	IRR	***p***	**IRR**	***p***	**IRR**	***p***	**IRR**	***p***
Neighborhood Disorder	1.27	<0.01	1.36	<0.01	1.31	<0.01	1.21	<0.01

*Adjusted for the percentage of African Americans by neighborhood